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**TRANSMITTAL LETTER
(General - Patent Pending)**

Docket No.
293.000218US

In Re Application Of: **Johann Engelhardt et al.**

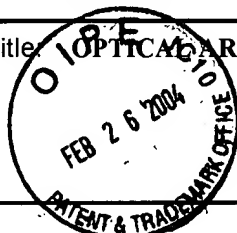
Serial No.
09/600,208

Filing Date
07/12/2000

Examiner
Thong Q. Nguyen

Group Art Unit
2872

Title: **OPTICAL ARRANGEMENT IN THE ILLUMINATION BEAM PATH OF A MICROSCOPE**



TO THE COMMISSIONER FOR PATENTS:

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- (1) Substitute Brief on Appeal *(in Triplicate)*
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Dated: **February 24, 2004**

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**IN THE UNITED STATES PATENT AND TRADEMARK
OFFICE**

Applicant: ENGELHARDT, Johann et al.

Examiner: NGUYEN, Thong Q.

Serial No.: 09/600,208

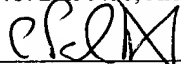
Art Unit: 2872

Filed: July 12, 2000

For: OPTICAL ARRANGEMENT IN
THE ILLUMINATION BEAM
PATH OF A MICROSCOPE

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SUBSTITUTE BRIEF ON APPEAL

(37 C.F.R. §1.192)

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Honorable Sir:

This Substitute Brief on Appeal is filed in reply to the Notification of Non-Compliance with 37 CFR 1.192(c) mailed January 26, 2004. The aforementioned Notification of Non-Compliance was issued in response to a Brief on Appeal filed November 18, 2003. The November 18, 2003 filing also included a \$330.00 filing fee for the aforementioned Brief on Appeal. A copy of the aforementioned Notification of Non-Compliance is attached.

Applicants respectively appeal the decision of the Examiner to finally reject Claims 17, 22, 23, 25, 28, 29, and 32-39, as set forth in the final Office Action of April 14, 2003.

REAL PARTY IN INTEREST

The Real Party in Interest in this matter is Leica Microsystems Heidelberg GmbH, assignee.

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RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences pertaining to this matter.

STATUS OF CLAIMS

Claims 17, 22, 23, 25, 28, 29, and 32-39 are currently pending in this application and are the subject of this appeal. Claims 18, 26, 27, and 31 were withdrawn from consideration as a result of the Restriction Requirement dated July 24, 2001. Claims 19-21, 24, and 30 have been cancelled.

STATUS OF AMENDMENTS

Applicants filed a Reply to Restriction Requirement on August 6, 2001 withdrawing Claims 18, 26, 27, and 31. An Amendment to Claims 17, 22, 28, 29, 32, and 38 and a Request for Reconsideration were filed on February 7, 2002 in response to the Office Action of November 7, 2001 (Claims 19-21 were cancelled). An Amendment of Claims 17, 24, 25, and 38 and a Request for Reconsideration after Final Rejection were filed on July 11, 2002 in response to the Final Office Action of May 22, 2002 (Claim 30 was cancelled). The Examiner issued an Advisory Action on August 1, 2002. Applicants filed a Request for Continued Examination on August 16, 2002 submitting the Amendment of July 11, 2002. An Amendment to Claims 17, 25, and 38, a substitute specification, and a Request for Reconsideration were filed on January 29, 2003 in response to the Office Action of October 31, 2002 (Claim 24 was cancelled). An Amendment of Claims 34 and 38 and a Request for Reconsideration after Final Rejection were filed on July 14, 2003 in response to the Final Office Action of April 14, 2003. The Examiner issued an Advisory Action on August 7, 2003, entering the amendments to Claims 34 and 38 and withdrawing the rejection to Claims 34-37

under 35 U.S.C. §112, second paragraph. Applicant filed a Notice of Appeal on August 14, 2003.

The Examiner issued a Notification of Non-Compliance with 37 CFR 1.192(c) on January 26, 2004.

SUMMARY OF THE INVENTION

The present invention is an apparatus for modifying the illumination diameter (7) of an illumination beam path (1) in a confocal laser microscope. The illumination source can be a point light source (2), an optical fiber (3), or a laser beam (4) or a parallel light beam of an alternative/conventional light source coupled via a lens (5) directly into illumination beam path (1). The illumination diameter (7) is modified to match the diameter of the entry pupil (8) of a selected objective (9) [page 5, lines 8 -19]. The apparatus comprises a zoom optical system that operates steplessly to modify the light from a point-like source, for example, point light source (2), before the light enters the selected objective (9) [page 6, lines 1-5].

The illumination optical system can further comprise an optical component (17) in the illumination beam path that influences or favors edge illumination [page 6, lines 8-17]. The present invention also can comprise an additional beamsplitter input (18) for feeding in a further light source (19), preferably providing a laser light beam [page 6, lines 18-23]. Additionally, a plurality of objectives (9), (9A), and (9B), respectively, can be mounted on carrier (20). Carrier (20) is operatively arranged for axial movement, to selectively position the plurality of objectives in the beam path [page 6, lines 24,25 to page 7, lines 1,2].

ISSUES PRESENTED FOR REVIEW

1. Whether Claims 17, 25, 28, 32, 33, and 39 were non-obvious under 35 U.S.C. §103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over United States Patent No. 5,184,012 (Yamamoto) in view of Japanese Patent No. 5-107037 (Hara et al.)?
2. Whether Claims 22 and 23 were non-obvious under 35 U.S.C. §103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over Yamamoto in view of Hara et al. and further in view of United States Patent No. 5,140,458 (Takagi et al.)?
3. Whether Claim 29 was non-obvious under 35 U.S.C. §103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over Yamamoto in view of Hara et al. with or without United States Patent No. 5,054,926 (Dabbs et al.)?
4. Whether Claims 34-36 were non-obvious under 35 U.S.C. §103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over Yamamoto in view of Hara et al. and further in view of United States Patent No. 4,530,578 (Kato)?
5. Whether Claim 37 was non-obvious under 35 U.S.C. §103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over Yamamoto in view of Hara et al. and further in view of Kato with or without United States Patent No. 5,672,880 (Kain)?
6. Whether Claim 38 was non-obvious under 35 U.S.C. §103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over Yamamoto in view of Hara et al. and further in view of United States Patent No. 5,404,238 (Dreessen et al.)?

GROUPING OF CLAIMS

Applicant respectfully submits that Claims 17, 22, 23, 25, 28, 29, and 32-39 stand or fall together.

ARGUMENT

1. The Rejection of Claims 17, 25, 28, 32, 33, and 39 under 35 U.S.C. §103(a)

a.) Summary of the Rejection:

The Examiner rejected Claims 17, 25, 28, 32, 23, and 39 under 35 U.S.C. §103(a) as being obvious and unpatentable over United States Patent No. 5,184,012 (Yamamoto) in view of Japanese Patent No. 5-107037 (Hara et al.).

The Examiner stated that, although Yamamoto did not teach a point-like source, it would have been obvious to modify the apparatus of Yamamoto to include the point-like source taught by Hara et al.

b.) The References cited by The Examiner: For purposes of providing background, Applicant briefly discusses the references cited by the Examiner.

1.) Yamamoto: Yamamoto teaches an apparatus for correcting the axis deviation in an optical scanning apparatus. Yamamoto teaches that the disclosed invention is used to modify the beam diameter of a conventional scanning apparatus that includes light source 1, which is not a point-like source. The apparatus taught by Yamamoto includes lenses 41, 42, 43, and 44, which change the diameter of a collimated beam of light. Yamamoto would not function with a

point-like source, and there is no teaching, suggestion, or motivation to use a point-like source, or modify the disclosed apparatus to receive light from a point-like source.

2.) Hara et al.: Hara et al. discloses a point-like source providing light to an optical arrangement. The point-like source overilluminates the entry pupil, exactly the problem the present invention solves. There is no teaching, suggestion, or motivation to use the point-like source of the disclosed apparatus with any other optical arrangement.

c.) The Present Invention

The present invention comprises an optical arrangement that receives light from a point-like source. The arrangement is configured to output a collimated beam of light whose diameter matches the entry pupil of an objective selected from among a plurality of objectives. Thus, regardless of which objective is selected, there is no overillumination of the entry pupil. The arrangement comprises a zoom optical system that operates steplessly.

d.) Arguments

1.) The references cited by the Examiner, considered individually and collectively, do not contain sufficient teaching, suggestion or motivation to combine/modify the references to create the present invention.

"Virtually all inventions are combinations of old elements. Therefore, an Examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue." *In re Rouffet*, 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998).

When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references and the teachings of the references can be combined only if there is some suggestion or incentive to do so. *In Re Lee*, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002), citing *In re Fine*. Hence, elements of separate patents cannot be combined when there is no suggestion of such combination in those patents. *Panduit Corp. v. Dennison Manufacturing Co.*, 1 U.S.P.Q.2d 1593 (Fed. Cir. 1987). Additionally, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills* 16 U.S.P.Q.2d 1430. Thus, the question of motivation to combine references is material to patentability and cannot be resolved on subjective belief and unknown authority. *In Re Lee, supra*. Moreover, deficiencies of the cited references cannot be remedied by general conclusions about what is “basic knowledge,” or “common sense.” *Id.* Indeed, “to imbue one of ordinary skill in the art with knowledge of the invention ... when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.” *Id*; *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303 (Fed. Cir. 1983).

In the present case, none of the prior art references cited by the Examiner contain an explicit or implicit teaching, suggestion, or motivation to create the subject invention and none teach, suggest, or motivate one to combine/modify their respective teachings with others to create the subject invention.

Yamamoto does not teach, suggest, or motivate the use of a point-like source. Yamamoto teaches that the disclosed apparatus is used to change the diameter of a conventional light source. The conventional light source disclosed is not a point-like source and there is no discussion whatsoever in Yamamoto to use a point-like source. Thus, Yamamoto does not contain a teaching, suggestion, or motivation such that one would make the combination/modification propounded by the Examiner.

Hara et al. discloses the use of a point-like source to overilluminate an entry pupil 5. There is no teaching, suggestion, or motivation to use the point-like source disclosed with an apparatus for matching the diameter of the beam to the diameter of an entry pupil. Thus, Hara et al. does not contain a teaching, suggestion, or motivation to make the combination/modification propounded by the Examiner.

For the reasons set forth above, Applicant respectfully submits that none of the references cited by the Examiner, considered individually and collectively, contain sufficient, teaching, suggestion, or motivation to combine or modify their teachings with those of others to create the invention claimed in Claim 17.

2.) The references cited by the Examiner teach away from the present invention.

Hara teaches away from the present invention such that one skilled in the art would not have selected Hara as a reference for solving the problem of overillumination of an entry pupil of an objective. Hara discloses an optical arrangement wherein light from source 2 is expanded and collimated before it is incident on pupil 5. The beam is rectangular before it is incident on the

circular pupil 5. Thus, Hara clearly teaches overillumination of pupil 5, which results in the inefficient exclusion of a portion of the incident beam. The present invention eliminates overillumination by the light source to maximize the efficiency of the microscope. The background of the present invention (Page 1, lines 6-16) specifically discusses the limitations of apparatuses of the type disclosed by Hara, wherein the light source overilluminates an optical component. Thus, one skilled in the art looking to solve the problem of overillumination would not look to Hara for a solution. A *prima facie* case of obviousness can be rebutted if one of the cited references teaches away from the claimed invention. See *In re Geisler*, 43 U.S.P.Q. 2d 1362, 1366 (Fed. Cir. 1997). Thus, Applicant respectfully submits that Claim 17 would not have been obvious to one having ordinary skill in the art in light of the cited references.

3.) The Examiner is applying impermissible hindsight reconstruction to create the subject invention.

Applicant submits that the Examiner is applying impermissible hindsight reconstruction to hold that the present invention is obvious in view of the prior art. Indeed, the suggestion to use a point-like source with an arrangement that matches the beam diameter with the entry pupil of a selected objective comes not from the teachings of the references considered individually or collectively, but from the Applicant's very own disclosure. Nonetheless, the Examiner asserts that the art of Hara is used as a secondary reference to show that the use of point-like sources is known to one skilled in the art. (Final Action, Page 13, lines 13 and 14) Applicant does not deny that point-like sources are known in the art. However, Applicant asserts that the appropriate test is not whether

individual elements are present in the cited art, but whether there is a teaching, suggestion, or motivation to combine the teachings of the references to create the claimed invention. It should be appreciated that, "there is nothing in the statutes or case law which makes, that which is within the capabilities of one skilled in the art synonymous with obviousness," and further that, "Virtually all inventions are combinations of old elements. Therefore, an Examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue." *Ex Parte Gerlach and Woerner*, 212 U.S.P.Q. 471 (Bd. of Patent Appeals 1980); *In re Rouffet*, 47 U.S.P.Q.2d1 453 (Fed. Cir. 1998). Thus, since there is no teaching, suggestion, or motivation to combine the teachings of the cited references as suggested by the Examiner, Applicant submits that the Examiner has applied impermissible hindsight in using that which the inventor taught against its teacher.

The Examiner also stated that a point-like source was not critical to the invention because other embodiments of the invention were disclosed in the specification. The Examiner has not cited any statute, regulation, MPEP section, or case law that includes the criticality requirement the Examiner has stated for an obviousness rejection, or patentability. Applicant respectfully argues that the requirements for patentability do not include a criticality requirement. The requirement at issue here in an obviousness rejection is that the prior art must teach, suggest, or motivate the combination of elements claimed by the Applicant. Since, as discussed above, the prior art cited by the Examiner does not teach, suggest, or motivate the invention recited in Claim 17, Applicant submits that Claim 17 is patentable over the cited references.

Claims 25, 28, 32, 33, and 39 depend, directly or indirectly, from Claim 17. Since Claim 17 is patentable in light of the cited references, Claims 25, 28, 32, 33, and 39 are patentable in light of the cited references.

2. The Rejection of Claims 22 and 23 under 35 U.S.C. §103(a)

Claims 22 and 23 depend, directly or indirectly, from Claim 17. Since Claim 17 is patentable in light of the cited references, Claims 22 and 23 are patentable in light of the cited references.

3. The Rejection of Claim 29 under 35 U.S.C. §103(a)

Claim 29 depends directly from Claim 17. Since Claim 17 is patentable in light of the cited references, Claim 29 is patentable in light of the cited references.

4. The Rejection of Claims 34-36 under 35 U.S.C. §103(a)

Claims 34-36 depend, directly or indirectly, from Claim 17. Since Claim 17 is patentable in light of the cited references, Claims 34-36 are patentable in light of the cited references.

5. The Rejection of Claim 37 under 35 U.S.C. §103(a)

Claim 37 depends indirectly from Claim 17. Since Claim 17 is patentable in light of the cited references, Claim 37 is patentable in light of the cited references.

6. The Rejection of Claim 38 under 35 U.S.C. §103(a)

a.) Summary of the Rejection:

The Examiner rejected Claim 38 under 35 U.S.C. §103(a) as being obvious and unpatentable over United States Patent No. 5,184,012 (Yamamoto) in view of Japanese Patent No. 5-107037 (Hara et al.) and further in view of United States Patent No. 5,404,238 (Dreessen et al.).

The Examiner stated that, although Yamamoto did not teach a point-like source, it would have been obvious to modify the apparatus of Yamamoto to include the point-like source taught by Hara et al.

b.) The References cited by The Examiner: For purposes of providing background, Applicant briefly discusses the references cited by the Examiner.

- 1.) Yamamoto: Discussed above.
- 2.) Hara et al.: Discussed above.
- 3.) Dreessen et al.: Dreessen et al. discloses an apparatus for providing an illumination beam for a microscope. Dreessen discloses that the light source is a Xenon flashtube. A Xenon flashtube is not a point-like source. Dreessen does not teach, suggest, or motivate the use of a point-like source.

c.) The Present Invention

Discussed above.

d.) Arguments

1.) The references cited by the Examiner, considered individually and collectively, do not contain sufficient teaching, suggestion or motivation to combine/modify the references to create the present invention.

In the present case, none of the prior art references cited by the Examiner contain an explicit or implicit teaching, suggestion, or motivation to create the subject invention and none teach,

suggest, or motivate one to combine/modify their respective teachings with others to create the subject invention.

As stated above, neither Yamamoto nor Hara et al. teach, suggest, or motivate the combination of their teachings as propounded by the Examiner. Further, there is no teaching, suggestion, or motivation in Dreessen to combine its teachings with either Yamamoto or Hara et al. Dreessen teaches coupling light from a non-point-like source 20 into a microscope system using fiber optic lines 16. There is no teaching, suggestion, or motivation to use a point-like source. There is also no teaching, suggestion, or motivation to change the diameter of the beam provided by the source to match an entry pupil of a selected objective. Thus, Dreessen does not contain a teaching, suggestion, or motivation such that one would make the combination/modification propounded by the Examiner

For the reasons set forth above, Applicant respectfully submits that none of the references cited by the Examiner, considered individually and collectively, contain sufficient, teaching, suggestion, or motivation to combine or modify their teachings with those of others to create the invention claimed in Claim 38.

2.) The references cited by the Examiner teach away from the present invention.

As stated above, Hara teaches away from the present invention, as it teaches that the point-like source 2 overilluminates pupil 5. The present invention eliminates overillumination by the light source to maximize the efficiency of the microscope. Thus, one skilled in the art looking to solve the problem of overillumination would not look to Hara for a solution. A *prima facie* case of

obviousness can be rebutted if one of the cited references teaches away from the claimed invention. See *In re Geisler*, 43 U.S.P.Q. 2d 1362, 1366 (Fed. Cir. 1997). Thus, Applicant submits that Claim 38 would not have been obvious to one having ordinary skill in the art in light of the cited references.

3.) The Examiner is applying impermissible hindsight reconstruction to create the subject invention.

Applicant submits that the Examiner is applying impermissible hindsight reconstruction to hold that the present invention is obvious in view of the prior art. Indeed, the suggestion to use a point-like source with an arrangement that matches the beam diameter with the entry pupil of a selected objective comes not from the teachings of the references considered individually or collectively, but from the Applicant's very own disclosure. It should be appreciated that, "there is nothing in the statutes or case law which makes, that which is within the capabilities of one skilled in the art synonymous with obviousness," and further that, "Virtually all inventions are combinations of old elements. Therefore, an Examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue." *Ex Parte Gerlach and Woerner*, 212 U.S.P.Q. 471 (Bd. of Patent Appeals 1980); *In re Rouffet*, 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998). There is no teaching, suggestion, or motivation in Dreessen to use a point-like source for any purpose. Applicant submits that the only suggestion to use a point-like source comes from Applicant's disclosure.

The Examiner has stated that a point-like source is not critical to the invention because other embodiments are disclosed. The Examiner has not cited any statute, regulation, MPEP section, or

case law that includes the criticality requirement the Examiner has stated for an obviousness rejection, or patentability. Applicant respectfully argues that the requirements for patentability do not include a criticality requirement. The requirement at issue here in an obviousness rejection is that the prior art must teach, suggest, or motivate the combination of elements claimed by the Applicant. Since, as discussed above, the prior art cited by the Examiner does not teach, suggest, or motivate the invention claimed in Claim 38, Applicant respectfully submits that Claim 38 is patentable over the cited references.

Conclusion

For the reasons set forth above, Applicant respectfully submits that Claims 17, 25, 28, 32, 33, and 39 are non-obvious over Yamamoto in view of Hara et al., and thus patentable under 35 U.S.C. 103(a). Applicant respectfully submits that Claims 22 and 23 are non-obvious over Yamamoto in view of Hara et al. and further in view of Takagi et al., and thus patentable under 35 U.S.C. 103(a). Applicant respectfully submits that Claim 29 is non-obvious over Yamamoto in view of Hara et al. with or without Dabbs et al., and thus patentable under 35 U.S.C. 103(a). Applicant respectfully submits that Claims 34-36 are non-obvious over Yamamoto in view of Hara et al. and further in view of Kato, and thus patentable under 35 U.S.C. 103(a). Applicant respectfully submits that Claim 37 is non-obvious over Yamamoto in view of Hara et al. and further in view of Kato with or without Kain, and thus patentable under 35 U.S.C. 103(a). Applicant respectfully submits that Claim 38 is non-obvious over Yamamoto in view of Hara et al. and further in view of Dreessen et al., and thus patentable under 35 U.S.C. 103(a).

Serial No. 09/600,208
Attorney Docket No. 000218US
Substitute Appeal Brief dated: February 24, 2004

Accordingly, Applicant prays that this Honorable Board will reverse the Examiner's rejection of Claims 17, 22, 23, 25, 28, 29, and 32-39.

Respectfully submitted,



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Dated: February 24, 2004
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Appendix

Reprinted herebelow are the claims involved in this appeal:

17. An optical arrangement in an illumination beam path of a confocal laser microscope comprising:

a point-like light source operatively arranged to emit an illumination beam along said illumination beam path; and,

an illumination optical system arranged in said illumination beam path for modifying an illumination diameter of said illumination beam of said microscope, wherein said illumination optical system is a zoom optical system which operates steplessly, wherein said microscope includes a plurality of predefined objectives selectively positionable in said illumination beam path, and said illumination optical system is operatively arranged to modify said illumination diameter to match an entry pupil of a selected one of said plurality of objectives.

22. The optical arrangement according to claim 17, wherein said zoom optical system is motorized.

23. The optical arrangement according to claim 22, wherein said zoom optical system is a video camera zoom optical system.

25. The optical arrangement according to claim 17, wherein said illumination optical system is operatively arranged to automatically modify said illumination diameter.

28. The optical arrangement according to claim 17, wherein said illumination optical system is arranged downstream from a point light source of said microscope.

29. The optical arrangement according to claim 17, wherein said illumination optical system is arranged downstream from an optical fiber light source of said microscope.

32. The optical arrangement according to claim 17, wherein said illumination optical system includes an expanding optical system for a coupled-in laser beam.

33. The optical arrangement according to claim 32, wherein said illumination beam is variably expandable in accordance with the ratio of the focal length of said variable optical system to the focal length of said expanding optical system.

34. The optical arrangement according to claim 17, further comprising an optical component in said illumination beam path for altering an intensity distribution of said illumination beam to increase illumination intensity near the edge of said illumination beam.

35. The optical arrangement according to claim 34, wherein said further optical component is an additional lens.

36. The optical arrangement according to claim 34, wherein said further optical component is an annular stop.

37. The optical arrangement according to claim 34, wherein said further optical component is a holographically generated optical element.

38. An optical arrangement in an illumination beam path of a confocal laser microscope comprising:

a point-like light source operatively arranged to emit an illumination beam along said illumination beam path;

an illumination optical system arranged in said illumination beam path for modifying an illumination diameter of said illumination beam of said microscope to match an entry pupil of a selected one of said plurality of objectives, wherein said illumination optical system is a zoom optical system which operates steplessly; and,

an additional input whereby a laser light beam from a further light source can be coupled in to said illumination beam path via an additional input and is adaptable to an entry pupil of an objective of said microscope with no adaptation of said actual illumination beam path.

39. The optical arrangement according to claim 17, wherein said microscope is a multiphoton laser scanning microscope.